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Management practices and operational economics in entrepreneurial livestock units under the national livestock mission in Karnataka

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Abstract

This study presents the findings of a concurrent evaluation of management practices and operational economics of livestock entrepreneurial units established under the National Livestock Mission's Entrepreneurship Development Programme (NLM-EDP) in Bengaluru division of Karnataka as on 31-3-2025. The scheme has effectively catalysed a transition towards commercial livestock entrepreneurship, demonstrated by the high adoption of improved housing (87.50%), universal vaccination (100%), and silage-making (58.33%). Despite these advancements, several challenges continue to constrain economic sustainability. A heavy dependence on purchased feed - constituting the largest share of recurring expenses (40.26 - 80.98%) - combined with low adoption of advanced feed technologies, highlights a critical gap in input self-sufficiency and points to the need for targeted capacity-building interventions. Profitability varied widely across units. Notably, an inverse relationship between unit size and per-animal profit was observed in small ruminants: smaller sheep/goat units achieved higher per-animal profitability than larger units, at the same time, the piggery enterprise demonstrated superior viability compared to small ruminant units. Severe constraints included the absence of organised marketing channels (87.50%), high initial investment (79.17%) and interest burden (75.00%). Overall, enhancing the impact of NLM-EDP requires interventions beyond capital subsidies - specifically ensuring access to quality breeds and fodder production, building capacities in breeding and feed management, promoting scalable and efficient models for small ruminant enterprises, addressing limitations associated with zero-grazing management practices, strengthening market linkages and revising financial norms to better reflect actual investment and operational costs.

Keywords: Entrepreneurship, national livestock mission, operational economics, sheep and goat, piggery, management practices, zero grazing

Introduction

Livestock rearing is a cornerstone of the Indian agrarian economy, providing critical livelihood support to millions of rural households, particularly the landless, small, and marginal farmers ^[1]. The sector contributes significantly to the agricultural Gross Domestic Product and ensures nutritional security ^[2]. Recognising its transformative potential, the Government of India launched the National Livestock Mission (NLM) in 2014-15, restructured in 2021-22, with a key component being the Entrepreneurship Development Programme (EDP). The NLM-EDP aims to catalyse sustainable and inclusive growth by providing

credit-linked capital subsidies for establishing viable livestock enterprises such as poultry, small ruminants, and piggery ^[3].

Karnataka has emerged as a leading state in implementing the NLM-EDP, accounting for the highest number of approved projects in India ^[4]. This transition from traditional to semi-intensive and intensive systems, while enhancing productivity, presents new challenges, including complex management requirements and higher input costs. Efficient management practices and sound operational economics are pivotal for the success and sustainability of these capital-intensive entrepreneurial ventures. While the operational

framework of NLM has been documented, there is a scarcity of empirical studies evaluating the on-ground management practices and their economic outcomes in established units. A concurrent evaluation is particularly relevant as it provides real-time feedback for mid-course corrections. Therefore, this study was conducted to analyse the management practices, infrastructure development, investment patterns, and operational economics of livestock entrepreneurial units established under the NLM-EDP in the Bengaluru division of Karnataka.

Materials and Methods

The study was conducted in the Bengaluru division of Karnataka, which comprises nine districts and has a high concentration of NLM-EDP units. A concurrent evaluation design was employed. The study employed a complete enumeration of all 24 NLM-EDP units in the division that were functional, having received the second subsidy instalment, as of 31 March 2025. Data were collected through pre-tested, structured questionnaires and direct observation to ensure accuracy.

The variables studied included: (i) Management practices: breed type, sourcing, housing (type, flooring, ventilation),

feeding (source of fodder, grazing, new technologies like silage), and health care (vaccination, deworming, service providers); (ii) Infrastructure development: unit size, type of housing, and construction details; (iii) Investment and economics: financial outlay (own fund, loan, subsidy), operational costs (feed, labour, veterinary, interest), and income from the sale of animals and manure. Net income was calculated as gross income minus total cost.

The collected data were systematically coded and analysed using Microsoft Excel. Descriptive statistics, viz., frequencies, percentages, means, and ranges, were used to summarise the data. The economic analysis involved the computation of cost structures and net returns for different unit sizes.

Ethical compliance: The study involved data collection from farmers with prior informed consent. The research protocol adhered to the ethical guidelines for social science research.

Results and Discussion

Socio-personal profile and unit characteristics

Table 1: Socio-personal profile and unit characteristics of beneficiaries under NLM-EDP (n=24)

Sl. No.	Particulars	Category	Frequency	Percentage (%)
1	Gender	Male	16	66.67
		Female	8	33.33
2	Age group	<35 years	2	8.33
		36-50 years	10	41.67
		>50 years	12	50.00
3	Landholding category	Large farmers	21	87.50
		Medium farmers	3	12.50
4	Irrigation facility	Borewell	24	100.00
		Drip irrigation	21	87.50
5	Fodder crop cultivation	Practised	23	95.83
6	Type of unit	Sheep/Goat (500+25)	17	70.83
		Sheep/Goat (200+10)	4	16.67
		Sheep/Goat (100+5)	2	8.33
		Pig unit (100+10)	1	4.17

Results (Table 1) revealed that the majority of beneficiaries (66.67%) were male, with half being above 50 years of age. A significant proportion (87.50%) were large farmers. All respondents had access to irrigated land, predominantly utilising borewells (100%) and drip irrigation systems (87.50%). Moreover, a large majority (95.83%) cultivated fodder crops, indicating strong integration between crop and livestock production systems. Most units (70.83%) were large-scale sheep/goat units (500+25 animals), followed by

200+10 (16.67%) and 100+5 (8.33%) units and one piggery unit (100+10). The results are indicating that the scheme largely attracted individuals with substantial resource bases, who aspired for establishing large units and build capital infrastructure by availing the substantially large subsidies (50%).

Management practices

Housing and breeding practices

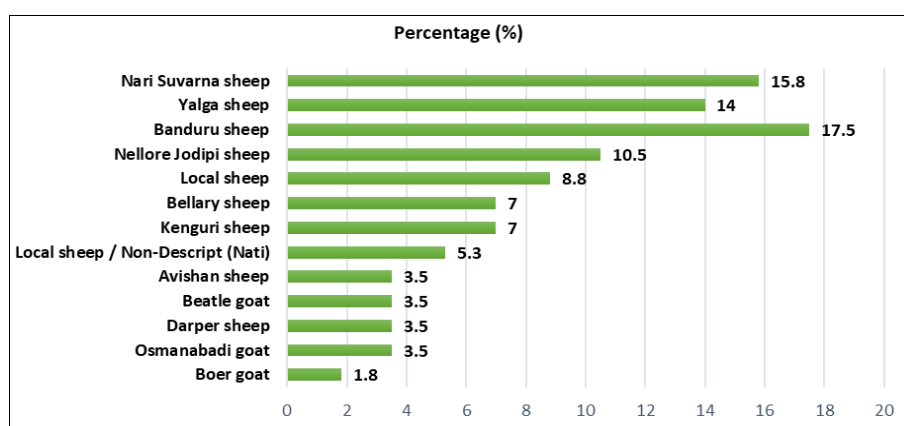
Table 2: Housing and breeding practices (n=24)

Sl. No.	Parameter	Category/Practice	Frequency	Percentage (%)
1	Type of housing	Elevated with open paddocks	21	87.50
2	Flooring material	Fibre mats	16	66.67
3	Adequate ventilation & drainage	Yes	23	95.83
4	Source of breeding stock	Local shandies	13	54.17
		Government farms	0	0.00
5	Breeding method	Natural service with improved males	24	100.00
6	Breeding stock strength	Decreased	16	66.67
7	Average purchase price of males (₹)	24,416 /-		
8	Average purchase price of females (₹)	14,760 /-		
9	Paid above DPR cost norms	Yes	21	87.50

The results (Table 2) further indicated that majority of the beneficiaries (87.50%) had elevated housing with ground-level open paddocks, a modern practice that improves animal health and manure management. Fibre mats were the most commonly used flooring material (66.67%). Ventilation and drainage were adequate in 95.83 per cent of the units, reflecting a significant infrastructural upgrade over the traditional system of livestock rearing.

With respect to breeds (Table 2 and Figure 1) the most frequently reared breeds were Banduru sheep (17.5%), Nari Suvarna sheep (15.8%), and Yalga sheep (14.0%), reflecting a preference for specific, high-demand indigenous and improved breeds. The breeds such as desi/non-descript, Nellore Jodipi, Bellary, Kenguri, etc, made the stock in small proportions. Choice of breed was predominantly driven by market demand (95.83%). A majority of beneficiaries (54.17%) sourced their initial breeding stock from local shandies, while none sourced from government breeding farms, highlighting a critical gap in the availability of quality and adequate quantity of breeding stock. This

reliance on informal markets can perpetuate the use of non-descript breeds and limit genetic gains, a concern that structured missions such as the NLM aim to address [5]. Notably, all units (100%) relied exclusively on natural service with improved males for breeding, indicating that advanced reproductive technologies such as Artificial Insemination have not yet permeated these entrepreneurial models. Two-thirds (66.67%) of units reported a decrease in their breeding stock over time, especially during induction period, with an average reduction of 25%, indicating potential challenges to herd sustainability or the need for strategic culling to improve immediate income. The average purchase price for breeding stock was ₹24,416 for males and ₹14,760 for females. Notably, 87.50 per cent of beneficiaries reported paying more than the DPR-proposed value, with an average increase of ₹5,100, confirming the divergence between DPR estimates and market prices, a bottleneck already identified by the National Livestock Mission [6] that necessitates periodic revision of cost norms.



Note: Percentages indicate how often each breed was reported, not the number of farmers, since many beneficiaries keep more than one breed.

Fig 1: Sheep/Goat breeds reared by NLM EDP beneficiaries

Fodder production and feeding practices

Feed and fodder management revealed (Table 3) a heavy reliance on external inputs. While 78.26 per cent grew their own green fodder, dry fodder (60.86%) and concentrates (69.56%) were largely purchased. The majority (66.67%) allocated 2-7 acres of land specifically for fodder production. However, 87.50 per cent of beneficiaries received no support for fodder cultivation under the NLM-EDP scheme, pointing to a critical area for intervention. Notably, only 33.33 per cent of beneficiaries practised exclusive stall-feeding, reflecting challenges faced by stall feeding over the traditional open grazing method. Feed cost constituted the largest share of recurring expenses (40.26-80.98%), aligning with the findings of Prasad *et al.* [7]. Silage making was the most adopted new technology (58.33%). In contrast, more advanced feed technologies saw minimal uptake: only a little (4.17%) of units employed Total Mixed Ration (TMR) and 8.33 per cent had adopted hydroponics for fodder production. Similarly, the niche status of hydroponics reflects its perception as a complex,

capital-intensive solution, despite its potential to address fodder scarcity in water-stressed regions, a challenge noted in semi-arid areas like those in this study [9]. From observations, it was evident that fodder production in NLM EDP units was inadequate and lacked proper planning. This underlines need for capacity building programmes for beneficiaries in farm management, especially, breeding, feeding, feed formulations fodder production and conservation. The extremely low adoption of TMR suggests that, despite its proven benefits for balanced nutrition and feed efficiency [8], barriers such as the need for specialised equipment and technical knowledge persist among small and medium entrepreneurs.

Feeding regimens differed significantly by feed type. Green fodder/silage was provided most frequently, with 45.83% of beneficiaries feeding twice daily. In contrast, dry fodder and concentrates were fed primarily once a day by 70.83 per cent of beneficiaries. This divergence reflects the need for an area-specific feeding regimen and training for beneficiaries.

Table 3: Fodder production and feeding practices (n=24)

Sl. No.	Parameter	Category/Practice	Frequency	Percentage (%) / Value
1	Own green fodder cultivation	Yes	18	78.26
2	Dry fodder procurement	Both purchased and produced	14	60.86
3	Concentrate feed source	Purchased	16	69.56
4	Land under fodder	2-7 acres	16	66.67
5	Fodder cultivation support under NLM	Not received	21	87.50
6	Feed cost share of total cost	-	-	40.26-80.98%
7	Adoption of silage making	Yes	14	58.33
8	Adoption of TMR	Yes	1	4.17
9	Adoption of hydroponics	Yes	2	8.33
10	Completely stall feeding		8	33.33
11	Average hours of grazing	-	-	5.65 hours

Frequency of feeding				
Sl. No.	Particulars	Once a day	twice a day	thrice a day
1	Green fodder/silage	8 (33.33%)	11 (45.83%)	12 (8.13%)
2	Dry fodder	17 (70.83%)	4 (16.66%)	0 (0.00%)
3	Concentrates	17 (70.83%)	4 (16.66%)	0 (0.00%)

Health care management practices

Regarding healthcare management (Table 4), all beneficiaries (100%) were practising vaccination, primarily against ET and PPR (95.65%). Government veterinarians were the primary healthcare service providers (91.30%), underscoring their continued importance and affordability, as observed by Kumar *et al.* [10]. However, diagnosis and treatment of diseased animals remained a challenge for majority of the beneficiaries. Deworming was most frequently practised quarterly (47.82%). Reliance on faecal examination for deworming was observed only 8.69 per cent

of every beneficiary. It may be due to lack of knowledge and also non-availability of diagnostic facility nearby, as also found by Ravikumar *et al.* [11], suggesting room for improvement in diagnostic-based interventions. A majority (73.91%) of respondents followed bio-security measures. However, a significant gap was observed in routine disinfection, with only 39.13 per cent of units using disinfectants for their sheds. Among these, formaldehyde was the most commonly applied chemical. This low adoption of a fundamental bio security practice is a serious concern, as poor hygiene significantly increases disease risks [12]. The adoption of other modern technologies was notable, including automatic drinkers (86.95%) and weighing scales (65.21%), though record-keeping was less prevalent (30.43%), indicating a focus on physical infrastructure over data-driven management.

Table 4: Health care management practices (n=24)

Sl. No.	Parameter	Particulars	Frequency	Percentage (%)
1	Vaccination practiced	Yes	24	100.00
2	Major vaccines used	ET, PPR	23	95.65
3	Healthcare provider	Govt. Veterinarians	21	91.30
4	Deworming frequency	Quarterly	11	47.82
5	Faecal exam before deworming	Yes	2	8.69
6	Biosecurity measures followed	Yes	17	73.91
7	Routine disinfection practised	Yes	9	39.13
8	Common disinfectant	Formaldehyde	-	-
9	Use of automatic drinkers	Yes	20	86.95
10	Use of weighing scales	Yes	15	65.21
11	Record keeping practised	Yes	7	30.43

Production and operational management

Table 5: Production and operational management of NLM-EDP units

Sl. No.	Parameter	Value/Percentage
1	Average mortality rate	6.12%
2	Average Daily Gain (ADG) - local breeds	127.86 g/day
3	Average Daily Gain (ADG) - improved breeds	193.80 g/day
4	Enterprise management by	Men 41.66%, Joint 45.83%, Women 12.50%
5	Main constraints identified	High feed cost, lack of breeding support, fodder scarcity and market fluctuation

The units demonstrated (Table 5) reasonable productivity, with an average mortality rate of 6.12 per cent and an Average Daily Gain (ADG) ranging from 127.86 g for local breeds to 193.8 g for improved breeds (Dorper and Nari Suvarna). The superior ADG of exotic breeds like Dorper aligns with ICAR^[13] findings that such breeds fetch premium prices due to better growth rates. In terms of

operational control, the management of enterprises was either joint (45.83%) or solely by men (41.66%), with only 8.33 per cent of units managed exclusively by women. This gender disparity in entrepreneurial leadership reflects broader trends in resource access and risk-taking behaviour, where women tend to have more limited access to capital and high-value enterprises, as noted by Bhatia and Singh [14].

Investment and operational economics

The investment analysis (Table 6) revealed that for the large 500+25 units, the average total outlay was ₹1,00,00,000,

constituting by an average subsidy of ₹49,34,375, a loan of ₹25,62,500, and an owner's investment of ₹25,06,250. The loan interest rate averaged at 11.66 per cent.

Table 6: Average investment details of NLM-EDP units of different sizes in Karnataka

Unit size	Own fund (₹)	Loan (₹)	Subsidy (₹)	Total outlay (₹)	Loan interest (%)
500+25 (n=17)	25,06,250	25,62,500	49,34,375	1,00,00,000	11.66
200+10 (n=4)	10,37,500	12,25,000	19,83,333	43,12,500	11.50
100+5 (n=2)	2,00,000	8,00,000	10,00,000	20,00,000	12.00
100+10 Piggery (n=1)	15,00,000	15,00,000	25,00,000	50,00,000	10.25

The operational economics (Table 7) showed that feed cost was the dominant component across all units. The net income/100 animals was highest for the piggery unit (₹16,46,250), followed by the smaller sheep/goat units (combined average ₹3,07,333 for 100+5 and 200+10). The

large 500+25 units had the lowest net income per 100 animals (₹1,08,807), indicating potential diseconomies of scale or higher operational inefficiencies in managing larger flocks. The high interest burden was reported as a severe constraint by 54.17 per cent of beneficiaries.

Table 7: Operational cost structure and net income of NLM-EDP units (per year)

Component	500+25 Unit (₹)	% Share	200+10 Unit (₹)	% Share	100+5 Unit (₹)	% Share	Piggery Unit (₹)	% Share
Feed & fodder	6,07,385	40.26	5,40,000	44.08	2,52,000	64.28	96,00,000	80.98
Labour	4,48,997	29.76	4,23,000	34.53	-	-	14,40,000	12.14
Interest paid	2,97,956	19.75	1,42,000	11.59	92,000	23.46	1,53,750	1.29
Total cost (TC)	15,08,598.81	100	12,25,000	100	3,92,000	100	1,18,53,750	100
Net income (I-TC)	5,44,035.15		38,667.00		2,88,000		16,46,250	
Net income/ 100 animals	1,08,807		3,07,333				16,46,250	

Constraints

The most severe marketing constraint was the absence of organised marketing channels or cooperatives, reported by 87.50 per cent of beneficiaries, leading to exploitation by middlemen and price fluctuations. This aligns with identified challenges in livestock sector development [15]. In running the units, the high interest burden on credit (79.16 Percentage Mean Score - PMS) and high feed costs (63.88 PMS) were major constraints.

The NLM-EDP has effectively catalysed the shift towards commercial, semi-intensive livestock farming in Karnataka. The adoption of improved housing, health care, and feeding technologies is commendable. However, the economic sustainability of these enterprises, particularly large small ruminant units, is challenged by high input costs, inadequate market linkages, and interest burdens. The discrepancy between DPR estimates and actual animal purchase costs necessitates a periodic revision of funding norms. The over-reliance on local shandies for breeding stock calls for strengthening the linkage with organised breeding farms. The superior profitability of the piggery unit suggests it is a highly viable enterprise under the NLM-EDP framework in the region.

The findings imply that for the NLM-EDP to achieve its goal of sustainable livelihood enhancement, policy interventions must focus beyond unit establishment. Future strategies should prioritise standardisation of feeding and reducing feeding costs, facilitating access to quality breeding stock, developing robust market infrastructure, providing refinancing options to minimise interest burdens, and regularly updating project cost norms to reflect market realities.

Conclusion

The NLM-EDP has successfully accelerated the shift toward commercial and semi-intensive livestock farming in

Karnataka, with good adoption of improved housing, health care, and basic feeding practices. Piggery units emerged as the most profitable enterprise under the programme. However, the economic sustainability of especially large small-ruminant units is constrained by high feed costs, weak market linkages, interest burdens, and reliance on local shandies for breeding stock. The mismatch between DPR estimates and actual procurement costs underscores the need to periodically revise project cost norms. For the programme to deliver sustainable livelihood gains, policy attention must extend beyond unit establishment. Reducing feed costs through standardised feeding technologies, improving access to quality breeding stock, strengthening market infrastructure, providing refinancing options, and updating funding norms regularly are essential. Enhanced technical support and stronger market networks will be critical for ensuring the long-term viability of NLM-supported livestock enterprises.

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Authorship contribution statement

Abhilash P. Baler: Conceptualisation, methodology, investigation, data curation, formal analysis, writing - original draft preparation.

Manjunatha L.: Chairperson for student research - Supervision, validation, writing, review & editing.

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Shivakumar K. Radder: Supervision, validation, writing - review & editing.

Vivek M. Patil: Supervision, validation, writing - review & editing.

K. B. Vedamurthy: Supervision, validation, writing - review & editing.

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